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## Visual Function Rescued in Rats Using Cells derived from iPS Cells

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Induced pluripotent stem (iPS) cells have created excitement and head scratching ever since they were first created a little over two years ago. The excitement arises from their creation through reprogramming adult cells by manipulating their gene function, which does not require a human embryo and could potentially give a patient personalized replacement cells. But determining just how identical they are to embryonic stem cells in function has caused much consternation.

Now, a team at UC Santa Barbara and University College London has provided some pro and con information on the functionality question. Working in a rat model for age-related macular degeneration in which defects in retinal pigmented epithelial (RPE) cells lead to death of photoreceptors, they showed that RPE cells grown from iPS cells inserted into the retina prior to photoreceptor death were able to rescue the receptors and the rats retained vision.

A press release from UCSB quoted Sherry Hikita, an author on the paper saying:

“Although much work remains to be done, we believe our results underscore the potential for stem-cell based therapies in the treatment of age-related macular degeneration.”

However, the team also saw a difference between the iPS derived RPE cells and embryonic stem cell-derived RPE cells used in earlier experiments. The ESC-derived cells survived after transplant long-term, where as the iPS-derived RPE cells suffered rejection by the immune system. This would not occur if the cells were derived from the patient receiving the therapy, but many leaders in the field have hoped that banks of iPS cells could be developed that would be less expensive than deriving new cells for each patient. Also, these banked cells could avoid transplanting cells with the same genetic mutation that caused the problem in the first place.

In the December 3 PLoS ONE the authors speculate:

“The embryonic origin of hESC-derived RPE may reflect a more immune privileged cell type in comparison to iPS-RPE.”

To further complicate the equation, the rats in this model retained long-term visual function despite rejection of the transplanted cells suggesting the transplanted cells induced some sort of protective response for RPE cells in the surrounding tissue.

*PLOS ONE*, December 3, 2010

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**Tags:** University of California Santa Barbara, Training, macular degeneration, iPS, Buchholz

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